BRUSHWELLMAN

MINING OPERATIONS & TOUR GUIDE

INTRODUCTION

The techniques used for mining beryllium bearing ore from the company's properties in western Utah are considered unique. They are unique because of the requirements that must be met to identify the ore body and the rock materials overlying the ore.

The mineralization contained within the host rock (tuff) produces no visible physical characteristics which would help one identify the presence of mineralization. The beryllium mineralization is colorless and the crystal structure is too small for recognition by the naked eye. Associate minerals, fluorspar and manganese, produce an identifying color, but their presence does not assure significant beryllium mineralization.

To properly identify the existence of beryllium mineralization and determine if an economic ore body exists, the mining division completes first a geological and geochemical study on an area. The study is followed by an extensive exploration and development drilling program to further determine the existence of a commercial ore body.

EXPLORATORY DRILLING - SEARCH FOR ORE

During the exploration and development drilling program, holes are drilled on a grid of approximately 100 feet. Data collected provides information on the size of the ore body, it's thickness and grade. Information on fault structures effecting mineralization are identified as is the rock material which make up the overburden cover.

The rock materials encountered during the drilling program are identified in descending order as follows:

ALLUVIUM	-	sand and gravel - Lake Bonneville deposits
RHYOLITE	-	an igneous extrusive rock having essentially the same chemical composition as granite, tightly bound and very hard
ALT. RHYOLITE	-	a decomposed rhyolite, decomposition took place during mineralization
TUFF	-	a volcanic ash, a host rock having a porosity capable of accepting mineralized solution - the tuff is in both a welded and non-welded state depending on geologic environment following deposition
LIMESTONE-DOLOMITE	-	a dense sedimentary calcareous rock underlying mineralized tuff

The tuff, sandwiched between the non-permeable rock formations, rhyolite and dolomitic-limestone, provides an excellent trap or home for meandering mineralized hydrothermal solutions and the formation of a potentially recoverable ore body.

(Fig. 1) illustrates an exploratory drilling program.

EXPLORATORY DRILLING
SEARCH FOR ORE

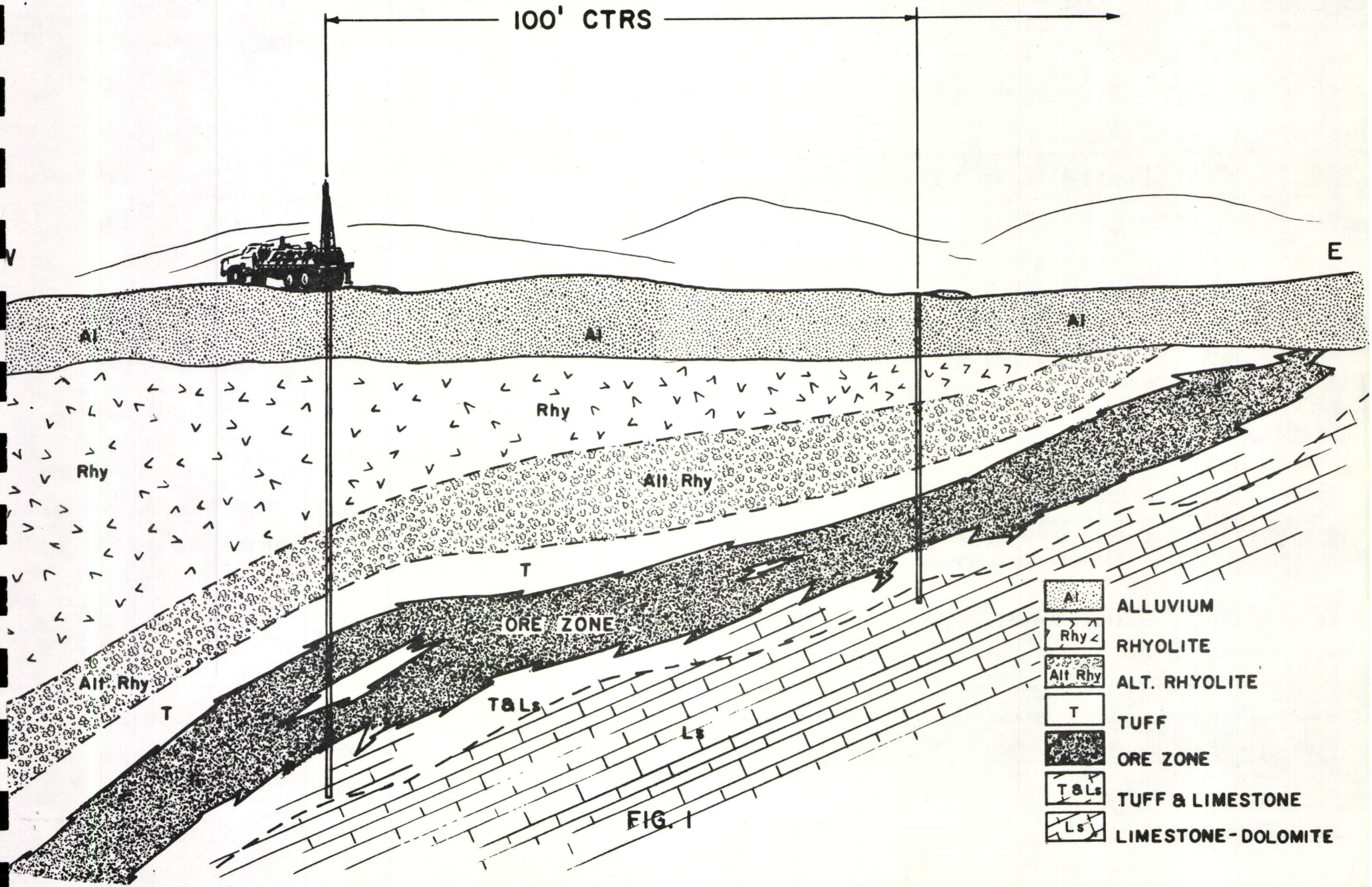

FIG. 1

DESIGNING AN OPEN-PIT

After an ore body has been identified and a decision has been made to place the properties in production, work begins on designing an open-pit.

Several pit designs are reviewed before selecting one which offers the most favorable ore recovery vs. overburden materials to be removed.

Facts considered on pit design:

1. tons of ore to be exposed,
2. volume of rock materials to be removed,
3. the weighted average grade of the ore and what is its distribution in-place.

Once the final design of an open-pit is chosen, in-house work begins with preparation of maps, cross-sections, and specifications of the project.

(Fig. 2) illustrates a cross-sectional view of designing an open-pit.

DESIGNING AN OPEN PIT

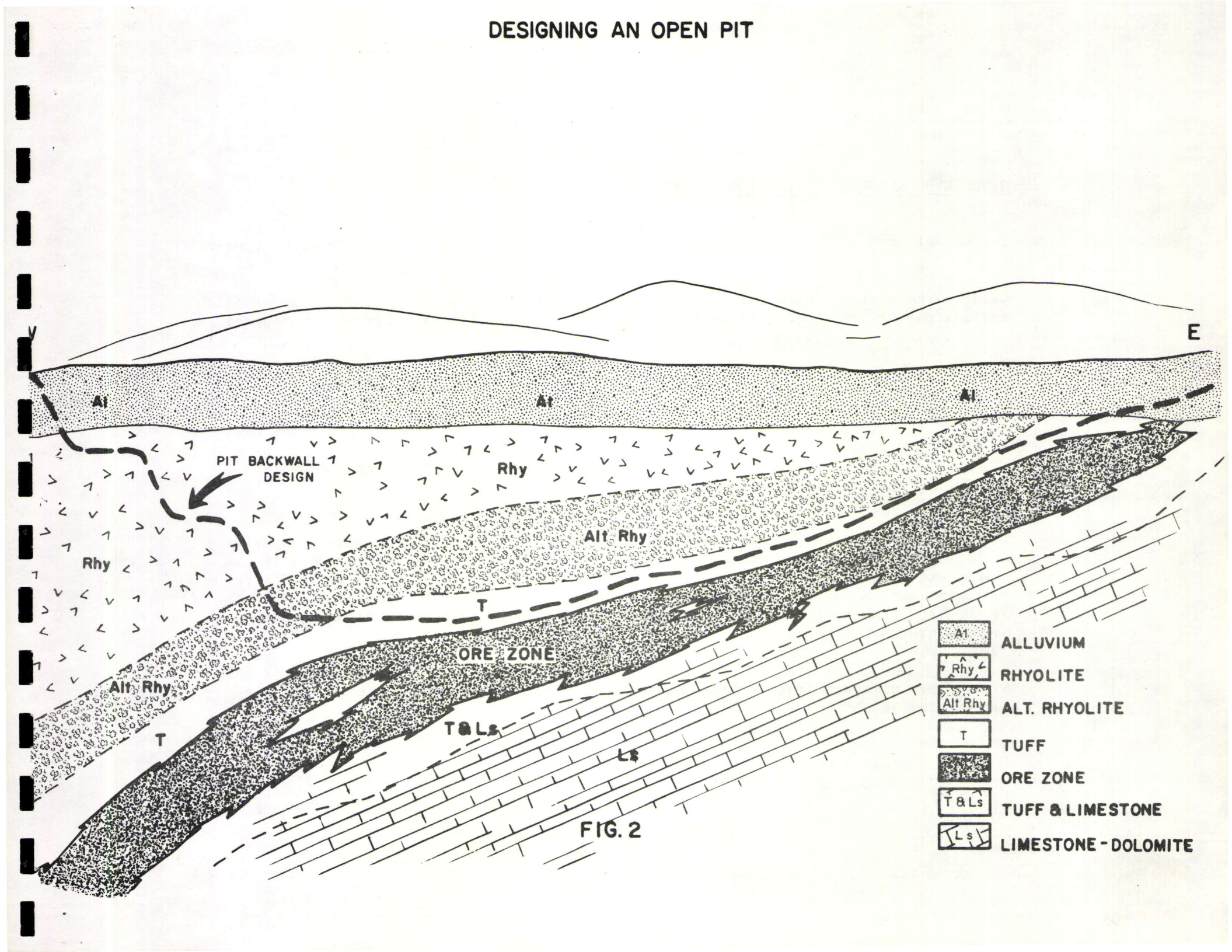

FIG. 2

OVERBURDEN REMOVAL - STRIPPING OPERATIONS

The actual work of removing the overburden and exposing the ore is completed by contract.

Local earth moving contractors are requested to bid on overburden removal. Supervision and control of the project is under the direction of Brush Mining Division personnel.

Overburden removal or stripping operations are normally conducted during the winter and spring. The advantages of completing the project during these seasons are:

(a) securing a contractor during his slow or off-season period, and

(b) working conditions in the desert are better during the cooler months.

The rock materials which must be removed during stripping operations require a variety of heavy rock-moving equipment. The alluvium, (sand and gravel) altered rhyolite, welded and non-welded tuff materials do not require blasting, they are removed with equipment such as push-cats, scrapers and self-loading scrapers. The rhyolite must be shot and broken, then removed with front-end loaders and heavy off-the-road rock hauling trucks.

A time span of approximately nine months is allowed for completing the stripping requirements.

(Fig. 3) a cross-sectional view of a completed open-pit.

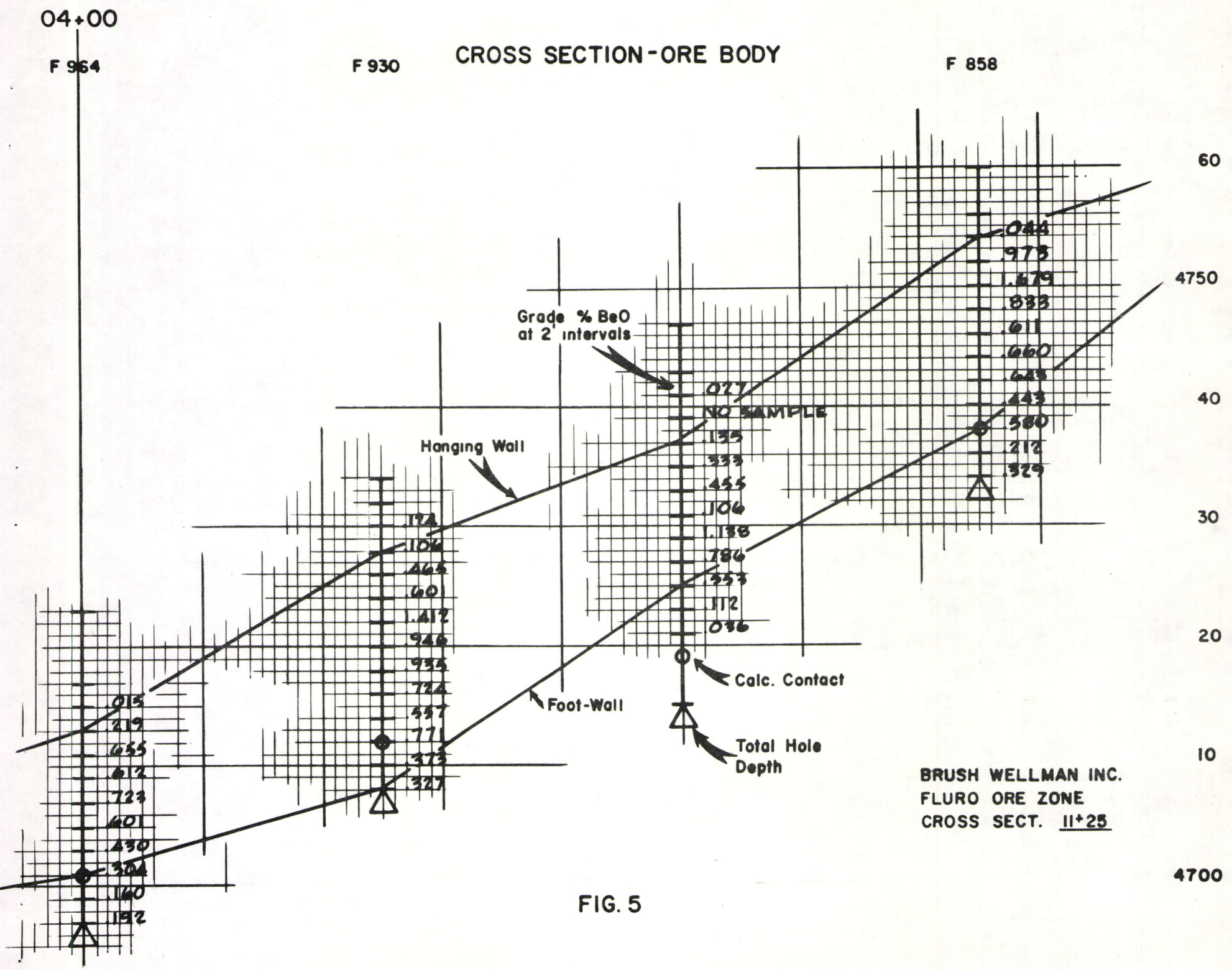
04+00
F 964
F 930
CROSS SECTION - ORE BODY
F 858
60
4750
40
30
20
10
4700
Grade % BeO at 2' intervals
Hanging Wall
Foot-Wall
Calc. Contact
Total Hole Depth
.077
NO SAMPLE
.135
333
455
.106
1.138
786
553
112
036
.174
.104
465
.60
1.412
946
955
724
457
771
.373
.327
.015
219
655
612
723
601
430
.304
160
192
044
.973
1.679
.833
.611
660
.443
.580
212
.329
BRUSH WELLMAN INC.
FLURO ORE ZONE
CROSS SECT. 11+25

FIG. 5

STRUCTURAL CONTOUR MAPS

From the cross-sections produced on 25-foot spacings, two additional maps are designed to aid mining and maximize recovery of the ore.

The two maps are structural contour maps - one of the hanging wall, and one of the foot wall. They produce a topographic view of the top and the bottom of the ore body.

(Figs. 6 and 6a) illustrate a hanging and foot-wall map. Each is designed with controls at approximately 2-foot intervals and are important tools for sound mining.

STRUCTURAL CONTOUR MAP
2 FT. INTERVAL
HANGING WALL

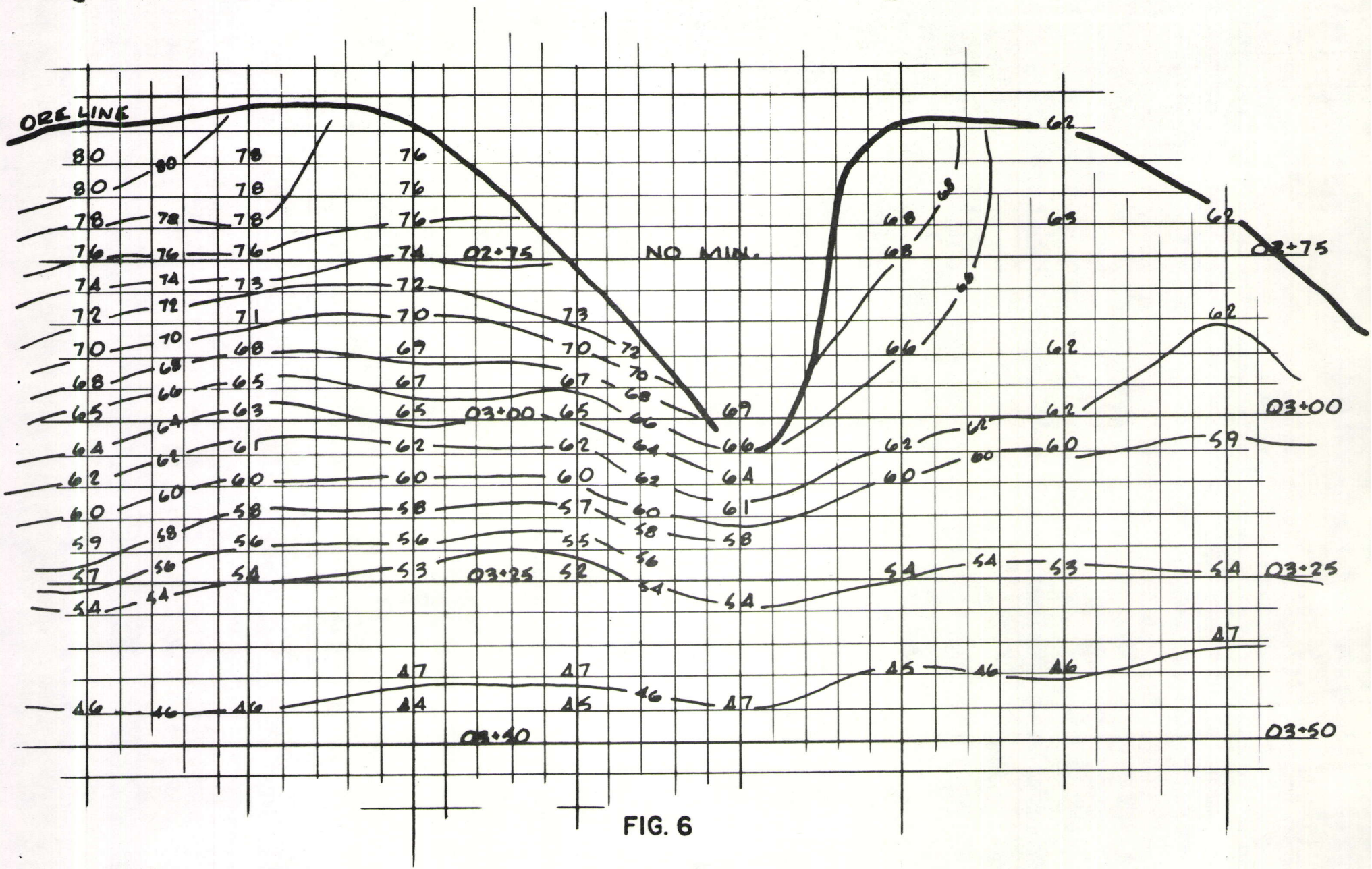

FIG. 6

STRUCTURAL CONTOUR MAP
2 FT. INTERVAL
FOOT-WALL

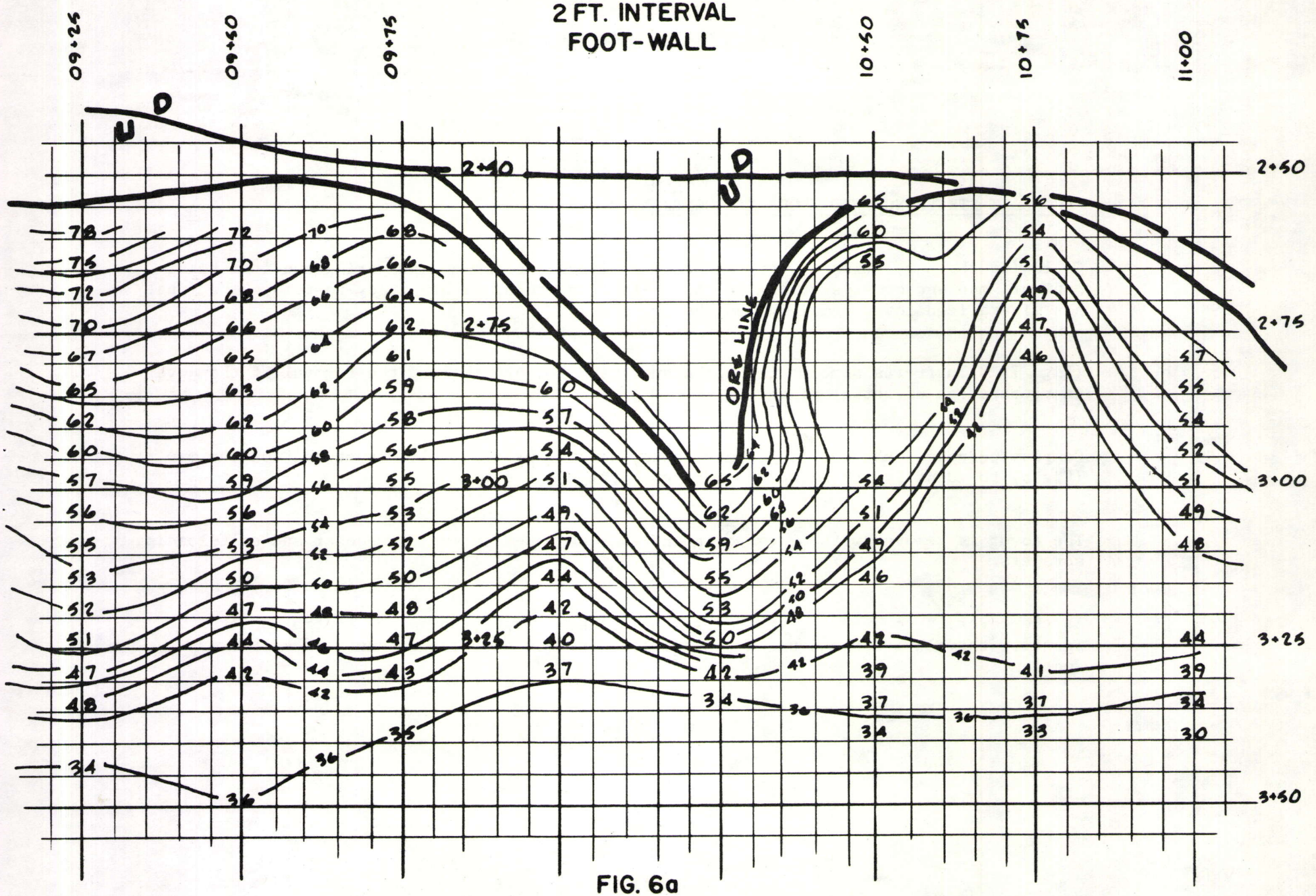

FIG. 6a

SECONDARY STRIPPING - ORE QUALITY CONTROL

Following the completion of the secondary drilling program and preparing the structural contour map and cross-sections on the 25-foot controls, we are ready to remove the final non-mineralized cover remaining on the ore body.

(Fig. 7) illustrates some of the techniques used for controlling the removal of the cover in preparation of actual mining.

Company personnel use the field berylometer and the hanging wall structural contour map, (Fig 6) to identify the actual contact with the ore body.

The cover is removed with heavy equipment such as a D-8 caterpillar-dozer and self-loading scrapers.

As the cover is removed, survey control points are established. The control points identify the elevation and the north-south, east-west coordinate points of each cross-section.

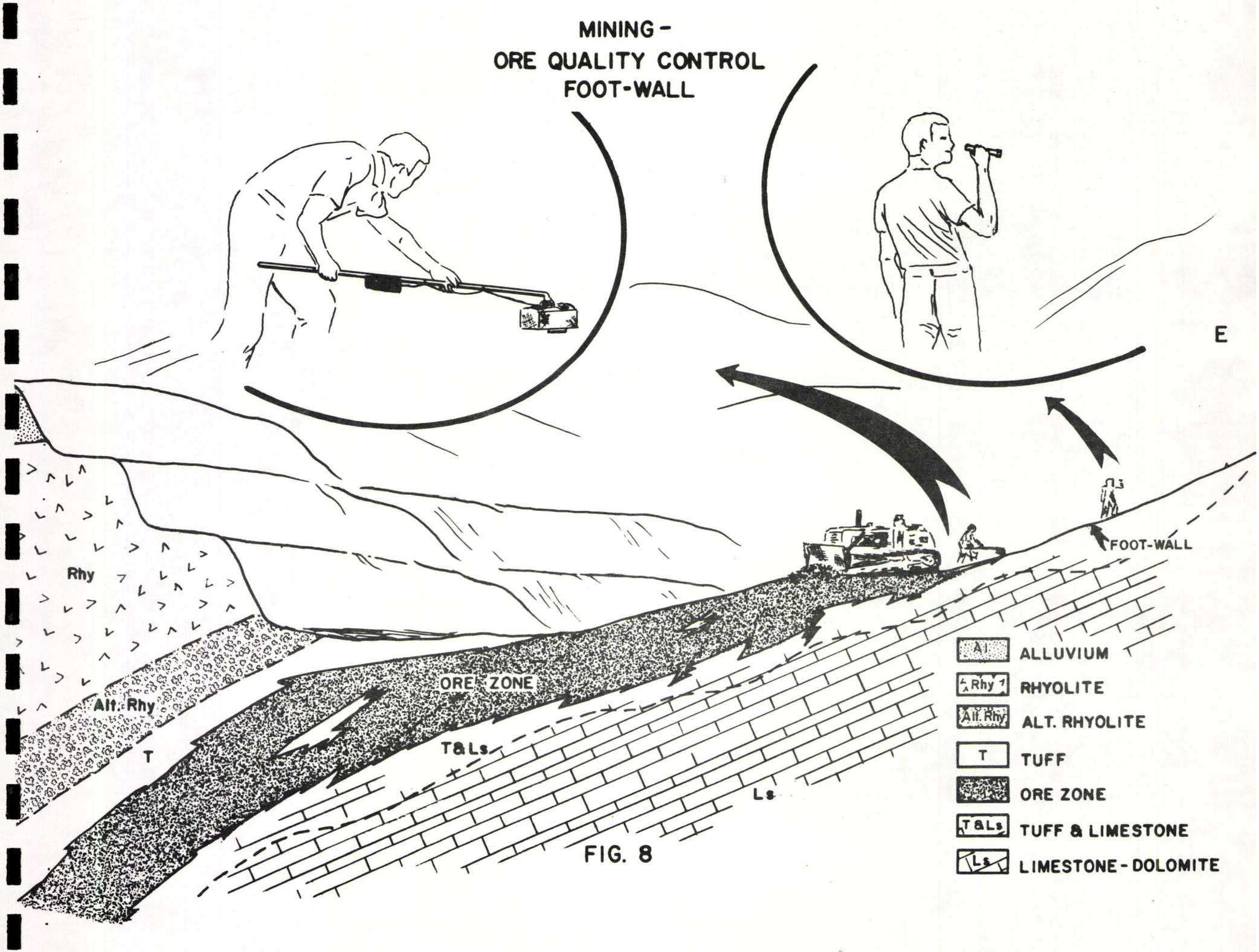
MINING -
ORE QUALITY CONTROL
FOOT-WALL
E
Rhy
Alt. Rhy
T
ORE ZONE
T&Ls
Ls
FOOT-WALL
Al ALLUVIUM
Rhy RHYOLITE
Alt. Rhy ALT. RHYOLITE
T TUFF
ORE ZONE
T&Ls TUFF & LIMESTONE
Ls LIMESTONE - DOLOMITE

FIG. 8

STOCKPILING THE ORE

The ore is placed in the stockpile as a homogeneous blend, (Fig. 9).

The ore is mined from selected or pre-determined areas of the ore body, placed in the stockpile in layers as blocks on top of each other. This method is successful in producing a homogeneous blend acceptable as mill feed.

STOCKPILING ORE

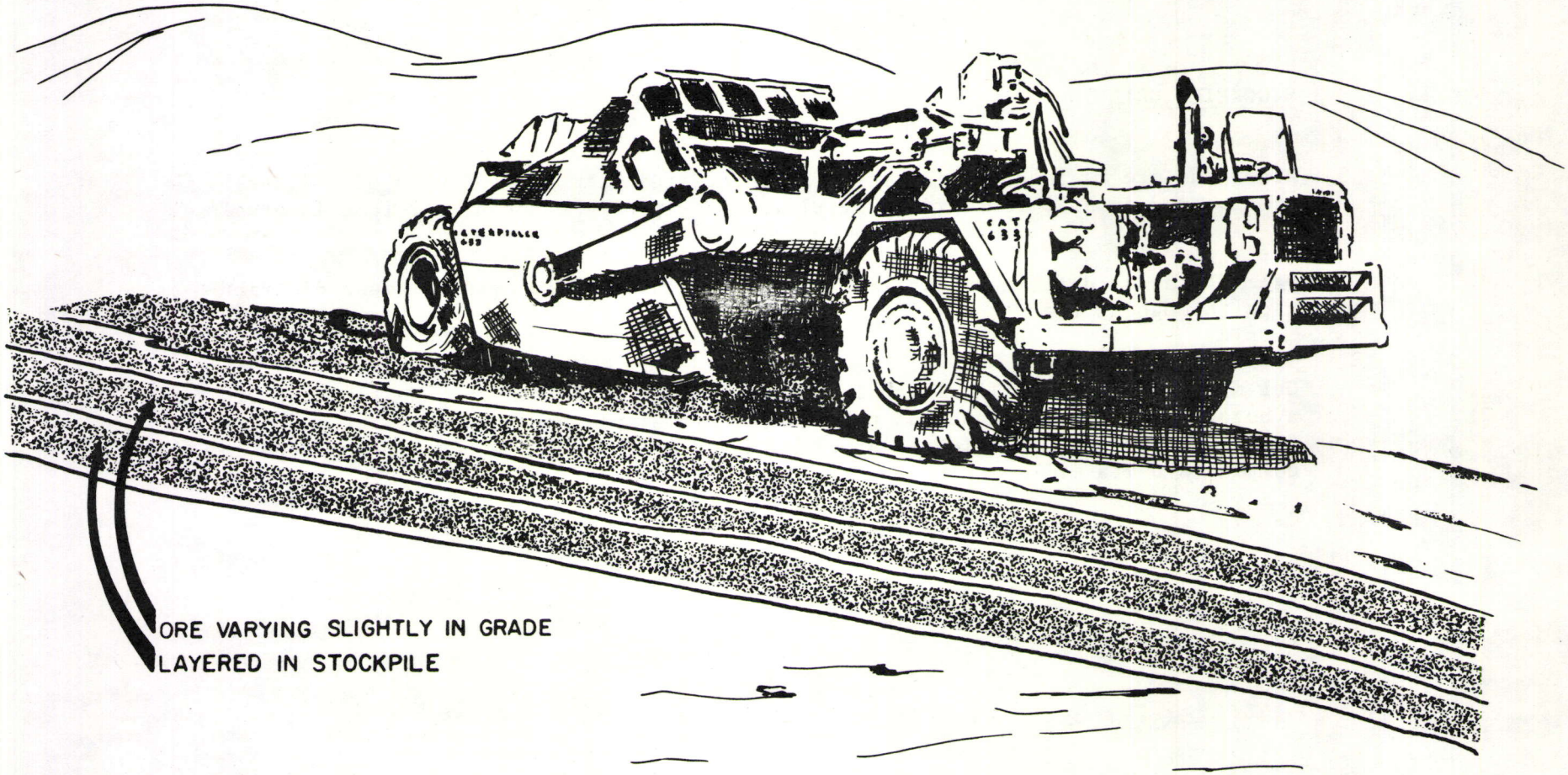

FIG. 9

STOCKPILE DRILLING

After the ore is in stockpile it is again drilled, sampled and assayed. Holes are located on a 20-foot grid, (Fig. 10) and samples are taken at 2-foot intervals.

From the assay data, a stockpile map is designed which identifies grade distribution throughout the stockpile.

Our mining and stockpiling techniques have proven satisfactory. We find the ore in a heterogenous environment and through the proper planning and applying sound mining techniques, the ore is lifted, stockpiled and available as a homogeneous feed for the company's Delta mill.

MINE AND MILL LOCATION MAP - showing the location of the company's operations relative to cities, towns and major highways.

This page is a reference page used to track documents internally for the Division of Oil, Gas and Mining

Mine Permit Number M0230003 Mine Name Topaz Mining Property
Operator Bruh Wellman Inc. Date December 1, 1988
TO _____ FROM _____

__CONFIDENTIAL __BOND CLOSURE __LARGE MAPS X EXPANDABLE
__MULTIPUL DOCUMENT TRACKING SHEET __NEW APPROVED NOI
__AMENDMENT _OTHER _____

Description YEAR-Record Number

__NOI X Incoming __Outgoing __Internal __Superceded

Mining Operations Tour Guide.

___NOI __Incoming __Outgoing __Internal __Superceded

__NOI __Incoming __Outgoing __Internal __Superceded

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__TEXT/ 81/2 X 11 MAP PAGES __11 X 17 MAPS __LARGE MAP

COMMENTS: _____

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